

U.S. Serial No. 09/847,042
Attorney Docket No. P-088-R
Page 17

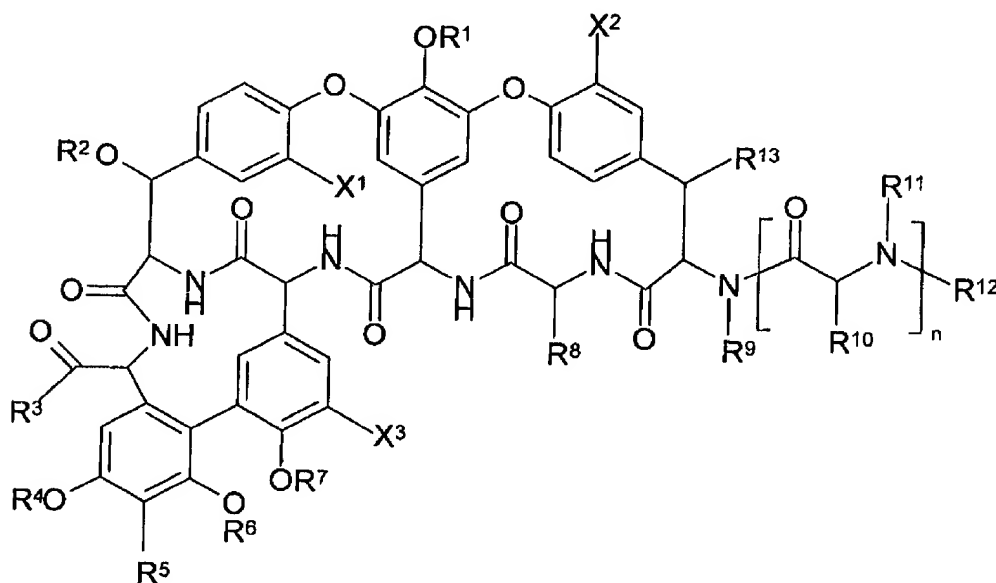
VERSION OF AMENDMENTS WITH MARKINGS TO SHOW CHANGES MADE

Please amend Claims 2, 3, 4, 5, 19, 28, 29 and 31 as follows (claims not being amended in this response are restated below for the convenience of the Examiner):

1. (Restated) A glycopeptide substituted with one or more substituents each comprising one or more phosphono groups; or a pharmaceutically acceptable salt, or stereoisomer, or prodrug thereof.
2. (Amended) ~~The glycopeptide of claim 1~~ A glycopeptide comprising a carboxy-terminus, wherein the glycopeptide is substituted at the ~~C-terminus~~ carboxy-terminus with a substituent comprising one or two phosphono groups.
3. (Amended) ~~The glycopeptide of claim 1~~ A glycopeptide comprising a 1,3-dihydroxyphenyl moiety, wherein the glycopeptide is substituted at the ~~R-terminus~~ 2-position of the 1,3-dihydroxyphenyl moiety with a substituent comprising one or two phosphono groups.
4. (Amended) The glycopeptide of claim 3, wherein the substituent at the ~~R-terminus~~ is N-(phosphonomethyl)aminomethyl; N-(2-hydroxy-2-phosphonoethyl)aminomethyl; N-carboxymethyl-N-(phosphonomethyl)aminomethyl; N,N-bis(phosphonomethyl)aminomethyl; or N-(3-phosphonopropyl)aminomethyl.

U.S. Serial No. 09/847,042
 Attorney Docket No. P-088-R
 Page 18

5. (Amended) ~~The glycopeptide of claim 1 which is a compound~~ A glycopeptide of formula I:



wherein:

R^1 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl, heterocyclic and $-R^a-Y-R^b-(Z)_x$; or R^1 is a saccharide group optionally substituted with $-R^a-Y-R^b-(Z)_x$, R^f , $-C(O)R^f$, or $-C(O)-R^a-Y-R^b-(Z)_x$;

R^2 is hydrogen or a saccharide group optionally substituted with $-R^a-Y-R^b-(Z)_x$, R^f , $-C(O)R^f$, or $-C(O)-R^a-Y-R^b-(Z)_x$;

R^3 is $-OR^c$, $-NR^cR^c$, $-O-R^a-Y-R^b-(Z)_x$, $-NR^c-R^a-Y-R^b-(Z)_x$, $-NR^cR^c$, or $-O-R^e$; or R^3 is a nitrogen-linked, oxygen-linked, or sulfur-linked substituent that comprises one or more phosphono groups;

R^4 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, $-R^a-Y-R^b-(Z)_x$, $-C(O)R^d$ and a saccharide group optionally substituted with $-R^a-Y-R^b-(Z)_x$, R^f , $-C(O)R^f$, or $-C(O)-R^a-Y-R^b-(Z)_x$;

U.S. Serial No. 09/847,042
Attorney Docket No. P-088-R
Page 19

R^4 and R^5 can be joined, together with the atoms to which they are attached, to form a heterocyclic ring optionally substituted with $-NR^c-R^a-Y-R^b-(Z)_x$;

R^5 is selected from the group consisting of hydrogen, halo, $-CH(R^c)-NR^cR^c$, $-CH(R^c)-NR^cR^c$, $-CH(R^c)-NR^c-R^a-Y-R^b-(Z)_x$, $-CH(R^c)-R^x$, $-CH(R^c)-NR^c-R^a-C(=O)-R^x$, and a substituent that comprises one or more phosphono groups;

R^6 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, $-R^a-Y-R^b-(Z)_x$, $-C(O)R^d$ and a saccharide group optionally substituted with $-R^a-Y-R^b-(Z)_x$, R^f , $-C(O)R^f$, or $-C(O)-R^a-Y-R^b-(Z)_x$, or R^5 and R^6 can be joined, together with the atoms to which they are attached, to form a heterocyclic ring optionally substituted with $-NR^c-R^a-Y-R^b-(Z)_x$;

R^7 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, $-R^a-Y-R^b-(Z)_x$, and $-C(O)R^d$;

R^8 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl and heterocyclic;

R^9 is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl and heterocyclic;

R^{10} is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl and heterocyclic; or R^8 and R^{10} are joined to form $-Ar^1-O-Ar^2-$, where Ar^1 and Ar^2 are independently arylene or heteroarylene;

R^{11} is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl and heterocyclic, or R^{10} and R^{11} are joined, together with the carbon and nitrogen atoms to which they are attached, to form a heterocyclic ring;

R^{12} is selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl,

U.S. Serial No. 09/847,042
 Attorney Docket No. P-088-R
 Page 20

cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl, heterocyclic, $-C(O)R^d$, $-C(NH)R^d$, $-C(O)NR^cR^c$, $-C(O)OR^d$, $-C(NH)NR^cR^c$, $-R^a-Y-R^b-(Z)_x$, and $-C(O)-R^a-Y-R^b-(Z)_x$, or R^{11} and R^{12} are joined, together with the nitrogen atom to which they are attached, to form a heterocyclic ring;

R^{13} is selected from the group consisting of hydrogen or $-OR^{14}$;

R^{14} is selected from hydrogen, $-C(O)R^d$ and a saccharide group;

each R^a is independently selected from the group consisting of alkylene, substituted alkylene, alkenylene, substituted alkenylene, alkynylene and substituted alkynylene;

each R^b is independently selected from the group consisting of a covalent bond, alkylene, substituted alkylene, alkenylene, substituted alkenylene, alkynylene and substituted alkynylene, provided R^b is not a covalent bond when Z is hydrogen;

each R^c is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl, heterocyclic and $-C(O)R^d$;

each R^d is independently selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl and heterocyclic;

R^e is a saccharide group;

each R^f is independently alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl, aryl, heteroaryl, or heterocyclic;

R^x is an N-linked amino saccharide or an N-linked heterocycle;

X^1 , X^2 and X^3 are independently selected from hydrogen or chloro;

each Y is independently selected from the group consisting of oxygen, sulfur, $-S-S-$, $-NR^c-$, $-S(O)-$, $-SO_2-$, $-NR^cC(O)-$, $-OSO_2-$, $-OC(O)-$, $-NR^cSO_2-$, $-C(O)NR^c-$, $-C(O)O-$, $-SO_2NR^c-$, $-SO_2O-$, $-P(O)(OR^c)O-$, $-P(O)(OR^c)NR^c-$, $-OP(O)(OR^c)O-$, $-OP(O)(OR^c)NR^c-$, $-OC(O)O-$, $-NR^cC(O)O-$, $-NR^cC(O)NR^c-$, $-OC(O)NR^c-$, $-C(=O)-$, and $-NR^cSO_2NR^c-$;

U.S. Serial No. 09/847,042
 Attorney Docket No. P-088-R
 Page 21

each Z is independently selected from hydrogen, aryl, cycloalkyl, cycloalkenyl, heteroaryl and heterocyclic;

n is 0, 1 or 2; and

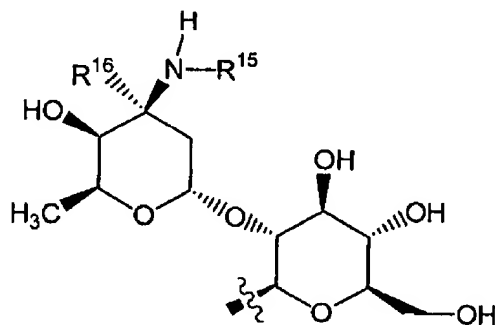
x is 1 or 2;

or a pharmaceutically acceptable salt, stereoisomer, or prodrug thereof;

provided at least one of R³ and R⁵ is a substituent comprising one or more phosphono groups.

6. (Restated) The glycopeptide of claim 5 wherein R¹ is a saccharide group optionally substituted with -R^a-Y-R^b-(Z)_x, R^f, -C(O)R^f, or -C(O)-R^a-Y-R^b-(Z).

7. (Restated) The glycopeptide of claim 5 wherein R¹ is a saccharide group of the formula:



wherein R¹⁵ is -R^a-Y-R^b-(Z)_x, R^f, -C(O)R^f, or -C(O)-R^a-Y-R^b-(Z)_x; and R¹⁶ is hydrogen or methyl.

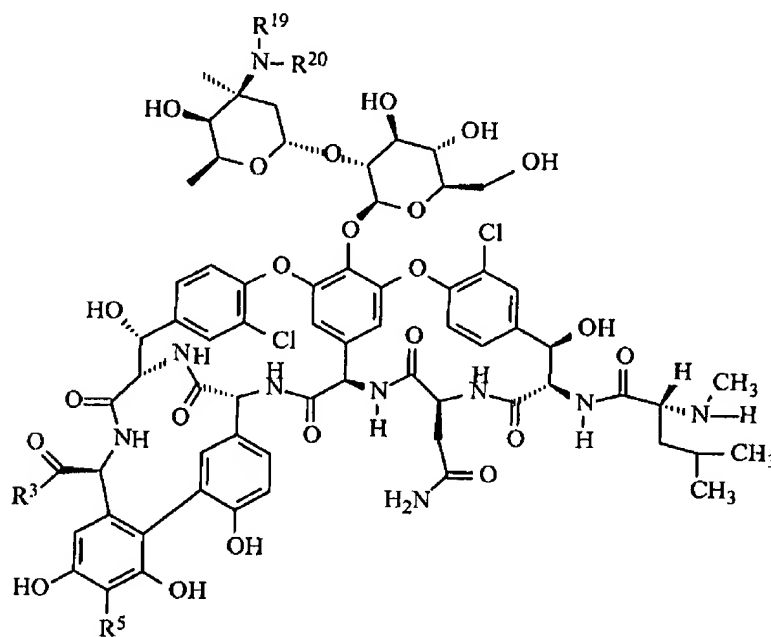
8. (Restated) The glycopeptide of claim 6 wherein R², R⁴, R⁶, and R⁷ are each hydrogen.

9. (Restated) The glycopeptide of claim 8 wherein R³ is -OH.

10. (Restated) The glycopeptide of claim 8 wherein R³ is a nitrogen-linked, oxygen-linked, or sulfur-linked substituent that comprises one or more phosphono groups.

U.S. Serial No. 09/847,042
 Attorney Docket No. P-088-R
 Page 22

11. (Restated) The glycopeptide of claim 10 wherein R^3 is a group of the formula $-O-R^a-P(O)(OH)_2$, $-S-R^a-P(O)(OH)_2$, or $-NR^c-R^a-P(O)(OH)_2$.
12. (Restated) The glycopeptide of claim 8 wherein R^5 is a group of the formula $-CH(R^{21})-N(R^c)-R^a-P(O)(OH)_2$; wherein R^{21} is hydrogen or R^d .
13. (Restated) The glycopeptide of claim 12 wherein R^5 is $-CH-NH-R^a-P(O)(OH)_2$.
14. (Restated) The glycopeptide of claim 5 which is a compound of formula II:



(II)

wherein:

R^{19} is hydrogen;

R^{20} is $-R^a-Y-R^b-(Z)_x$, R^f , $-C(O)R^f$, or $-C(O)-R^a-Y-R^b-(Z)_x$; and

R^a , Y , R^b , Z , x , R^f , R^3 , and R^5 have the values defined in claim 5;

or a pharmaceutically acceptable salt, or stereoisomer, or prodrug thereof;

U.S. Serial No. 09/847,042
 Attorney Docket No. P-088-R
 Page 23

provided at least one of R^3 and R^5 is a substituent comprising one or more phosphono groups.

15. (Restated) The glycopeptide of claim 14 wherein R^3 is $-OH$.
16. (Restated) The glycopeptide of claim 14 wherein R^3 is a nitrogen-linked, oxygen-linked, or sulfur-linked substituent that comprises one or more phosphono groups.
17. (Restated) The glycopeptide of claim 14 wherein R^3 is a group of the formula $-O-R^a-P(O)(OH)_2$, $-S-R^a-P(O)(OH)_2$, or $-NR^c-R^a-P(O)(OH)_2$.
18. (Restated) The glycopeptide of claim 14 wherein R^5 is a group of the formula $-(CH(R^{21})-N(R^c)-R^a-P(O)(OH)_2)$; wherein R^{21} is hydrogen or R^d .
19. (Amended) The glycopeptide of claim 14 wherein R^{20} is $-CH_2CH_2-NH-(CH_2)_9CH_3$; $-CH_2CH_2CH_2-NH-(CH_2)_8CH_3$; $-CH_2CH_2CH_2CH_2-NH-(CH_2)_7CH_3$; $-CH_2CH_2-NHSO_2-(CH_2)_9CH_3$; $-CH_2CH_2-NHSO_2-(CH_2)_{11}CH_3$; $-CH_2CH_2-S-(CH_2)_8CH_3$; $-CH_2CH_2-S-(CH_2)_9CH_3$; $-CH_2CH_2-S-(CH_2)_{10}CH_3$; $-CH_2CH_2CH_2-S-(CH_2)_8CH_3$; $-CH_2CH_2CH_2-S-(CH_2)_9CH_3$; $-CH_2CH_2CH_2-S-(CH_2)_3-CH=CH-(CH_2)_4CH_3$ (*trans*); $-CH_2CH_2CH_2CH_2-S-(CH_2)_7CH_3$; $-CH_2CH_2-S(O)-(CH_2)_9CH_3$; $-CH_2CH_2-S-(CH_2)_6Ph$; $-CH_2CH_2-S-(CH_2)_8Ph$; $-CH_2CH_2CH_2-S-(CH_2)_8Ph$; $-CH_2CH_2-NH-CH_2-4-(4-Cl-Ph)-Ph$; $-CH_2CH_2-NH-CH_2-4-[4-(CH_3)_2CHCH_2-]-Ph$; $-CH_2CH_2-NH-CH_2-4-(4-CF_3-Ph)-Ph$; $-CH_2CH_2-S-CH_2-4-(4-Cl-Ph)-Ph$; $-CH_2CH_2-S(O)-CH_2-4-(4-Cl-Ph)-Ph$; $-CH_2CH_2CH_2-S-CH_2-4-(4-Cl-Ph)-Ph$; $-CH_2CH_2CH_2-S-CH_2-4-[3,4-di-Cl-PhCH_2O-]-Ph$; $-CH_2CH_2CH_2-S-CH_2-4-(3,4-di-Cl-PhCH_2O-)-Ph$; $-CH_2CH_2-NHSO_2-CH_2-4-[4-(4-Ph)-Ph]-Ph$; $-CH_2CH_2CH_2-NHSO_2-CH_2-4-(4-Cl-Ph)-Ph$; $-CH_2CH_2CH_2-NHSO_2-CH_2-4-(Ph-C\equiv C-)-Ph$; $-CH_2CH_2CH_2-NHSO_2-4-(4-Cl-Ph)-Ph$; or $-CH_2CH_2CH_2-NHSO_2-4-(naphth-2-yl)-Ph$.

U.S. Serial No. 09/847,042
Attorney Docket No. P-088-R
Page 24

20. (Restated) The glycopeptide of claim 14 wherein R³ is -OH; R⁵ is N-(phosphonomethyl)aminomethyl; R¹⁹ is hydrogen, and R²⁰ is -CH₂CH₂-NH-(CH₂)₉CH₃; or a pharmaceutically acceptable salt thereof.
21. (Restated) The glycopeptide of claim 14 wherein R³ is -OH; R⁵ is N-(phosphonomethyl)aminomethyl; R¹⁹ is hydrogen, and R²⁰ is -CH₂CH₂-NH-(CH₂)₉CH₃.
22. (Restated) The glycopeptide of claim 20 which is the hydrochloride salt.
23. (Restated) A pharmaceutical composition comprising a pharmaceutically acceptable carrier and a therapeutically effective amount of a glycopeptide of any one of claims 1, 5, 14, and 20.
24. (Restated) The pharmaceutical composition of Claim 23, which comprises a cyclodextrin.
25. (Restated) The composition of claim 24 wherein the cyclodextrin is hydroxypropyl-β-cyclodextrin.
26. (Restated) The composition of claim 25 which comprises from about 250 mg to about 1000 mg of the glycopeptide and from about 250 mg to about 10 g hydroxypropyl-β-cyclodextrin.
27. (Restated) The composition of claim 26 wherein the weight ratio of hydroxypropyl-β-cyclodextrin to the glycopeptide is from about 1:1 to about 10:1 inclusive.
28. (Amended) A method for preparing a glycopeptide ~~as described claim 1 which is substituted at the C-terminus of claim 2~~, comprising derivatizing a corresponding starting glycopeptide wherein the ~~C-terminus~~ carboxy-terminus is a carboxy group.

U.S. Serial No. 09/847,042
Attorney Docket No. P-088-R
Page 25

29. (Amended) A method for preparing a glycopeptide ~~as described claim 1 which is substituted at the R-terminus~~ of claim 3, comprising derivatizing a corresponding starting glycopeptide wherein the ~~R-terminus~~ 2-position of the 1,3-dihydroxyphenyl moiety is unsubstituted.

30. (Restated) A method of treating a mammal having a bacterial disease, the method comprising administering to the mammal a therapeutically effective amount of a glycopeptide of any one of claims 1, 5, 14, or 20.

31. (Amended) A method of treating a mammal having a bacterial disease, the method comprising administering to the mammal a therapeutically effective amount of a pharmaceutical composition of ~~any one of claims~~ claim 23.